

Math 4973 - Dynamical Systems

Homework #3

Assigned - 2011.06.20

Name: _____

Consider the logistic function $F_\lambda = \lambda x(1 - x)$, where the parameter $\lambda \in \mathbb{R}$.

1. For which values of λ does F_λ have an attracting fixed point at $x = 0$?
2. For which values of λ does F_λ have a nonzero attracting fixed point?
3. Describe the bifurcation that occurs when $\lambda = 1$.
4. Sketch the phase portrait and bifurcation diagram near $\lambda = 1$.
5. Describe the bifurcation that occurs when $\lambda = 3$.
6. Sketch the phase portrait and bifurcation diagram near $\lambda = 3$.
7. Describe the bifurcation that occurs when $\lambda = -1$.
8. Compute an explicit formula for the periodic points of period 2 for F_λ .